

Section 1 – Overview of Updated NPEP Priority Chemicals Trends Report

Introduction

The EPA Office of Solid Waste identified 30 chemicals¹ on which to focus its efforts to reduce these chemicals in hazardous wastes. These 30 chemicals, referred to as the NPEP Priority Chemicals (PCs), consist of 27 organics and 3 metals that are frequently found in releases to water, air, and land. Under the Government Performance and Results Act (GPRA), one of the goals set by EPA for the RCRA National Partnership for Environmental Priorities is to reduce, as a nation, the presence of NPEP Priority Chemicals in hazardous wastes by 50 percent by the year 2005, compared to the quantities generated in 1991. This update of the NPEP Trends Report evaluates the progress made in achieving this goal. This report also provides updated trends analyses regarding the quantities of NPEP Priority Chemicals contained in hazardous wastes at the national, EPA Region, state, and industry sector levels. EPA believes this report can be used as a tool to support the Resource Conservation Challenge (RCC) – the program implemented in 2002 by EPA to reduce the use of raw materials, reuse materials to make new products or generate energy, and reduce the generation of wastes containing the NPEP Priority. The NPEP Trends Report is used to assist EPA in identifying potential partners to participate in the recently launched National Partnership for Environmental Priorities. The purpose of this program is to encourage government agencies, businesses, and manufacturers to voluntarily enroll in a partnership with EPA to find ways to reduce NPEP Priority Chemicals contained in wastes through source reduction and recycling. The data and trends analyses developed for this report will hopefully assist in our endeavor to better understand trends in waste generation and management, assess chemical reduction priorities, and identify opportunities for eliminating or reducing the NPEP Priority Chemicals.

Among the many opportunities for NPEP Priority Chemical reductions that may be available in manufacturing or other commercial operations, EPA is focusing its efforts to reduce these 30 NPEP Priority Chemicals that are frequently found in wastes. The organic chemicals were chosen because they are persistent, bioaccumulative, and toxic and are present in soil, sediment, ground water, surface water, air, and/or biota. Further, they are currently being generated (either intentionally or as a by-product or impurity) and continue to be released to the environment potentially furthering existing problems and creating new ones. These organics are also found in wastes, with many serving as the basis for a waste being classified as hazardous. Many of these organics also pose remediation difficulties once they get into the environment resulting in costly cleanup efforts. The three metals were selected because they occur frequently in RCRA waste streams and to be consistent with international efforts to which the United States has commitments. While EPA encourages all generators to reduce the quantity of waste they generate, the Agency believes that reduction in the generation of hazardous waste containing any of these 30 chemicals should be the first priority. In particular, we encourage this reduction to be achieved not by simply moving or transferring the chemicals from the waste stream into other environmental media (e.g., air, soil), but by reducing the use of these chemicals at the source, whenever possible. When reduction at the source is not possible, environmentally sound recycling practices should be used.

¹ For the purposes of developing this list of 30 chemicals, endosulfan alpha and endosulfan beta were counted together and heptachlor and heptachlor epoxide were counted together. Also, each of the three metals (lead, cadmium, and mercury) is combined with its associated metal compounds and addressed as a single NPEP Priority Chemical in this report. For example, lead/lead compounds are addressed as a single NPEP Priority Chemical.

What does this Report Cover?

Of the 30 chemicals identified by EPA as NPEP Priority Chemicals, 17 chemicals have been reported to the Toxics Release Inventory (TRI) since 1991 as shown in Exhibit 13, and are the chemicals that EPA is tracking for the purpose of measuring progress toward the 2005 GPRA goal. This report evaluates the progress made in achieving the national goal of a 50 percent reduction of NPEP Priority Chemicals in RCRA Subtitle C hazardous waste by 2005, compared to the quantity of NPEP Priority Chemicals in 1991 (see Chapter 2). In addition, we also need to track trends for all the NPEP Priority Chemicals – to identify opportunities in NPEP Priority Chemical reductions. As such, this report also updates the trends analyses for all NPEP Priority Chemicals contained in RCRA Subtitle C hazardous waste for which there is TRI data from 1998 to 2001 (see Chapter 3). Hazardous Waste Biennial Report data for each NPEP Priority Chemical is also incorporated into this updated Trends Report, including those NPEP Priority Chemicals not reported to TRI.

Each analysis is provided at the national, EPA Region, state, and industry sector levels. This report provides information about releases and management of the NPEP Priority Chemicals through the 2001 TRI reporting year. Appendix A provides a list of the states within each EPA region. A more comprehensive discussion of the measurement methodologies used to determine NPEP Priority Chemical quantities is presented in Appendix B.

Exhibit 13. NPEP Priority Chemicals

NPEP Priority Chemical Names and CAS Numbers	
NPEP PRIORITY CHEMICALS REPORTED TO TRI SINCE 1991	
Anthracene (120-12-7)	Mercury (7439-97-6) and Mercury Compounds (N458)
Cadmium and (7440-43-9) Cadmium Compounds (N078)	Methoxychlor (72-43-5)
Dibenzofuran (132-64-9)	Naphthalene (91-20-3)
Heptachlor (76-44-8)	Pentachlorophenol (87-86-5)
Hexachloro-1, 3-butadiene (87-68-3)	Quintozene (82-68-8)
Hexachlorobenzene (118-74-1)	1,2,4-Trichlorobenzene (120-82-1)
Hexachloroethane (67-72-1)	2,4,5-Trichlorophenol (95-95-4)
Lead (7439-92-1) and Lead Compounds (N420)	Trifluralin (1582-09-8)
Lindane (58-89-9)	
NPEP PRIORITY CHEMICALS FOR WHICH REPORTING TO TRI BEGAN IN 1995 or 2000	
Benzo(g,h,i)perylene (2000) (191-24-2)	Pendimethalin (1995) (40487-42-1)
Dioxins and Dioxin-like Compounds (2000) (N150)	Pentachlorobenzene (2000) (608-93-5)
TRI polycyclic aromatic compound (PAC) category (1995) (N590)	Phenanthrene (1995) (85-01-8)
NPEP PRIORITY CHEMICALS NOT REPORTED TO TRI	
Acenaphthene (83-32-9)	Fluorene (86-73-7)
Acenaphthylene (208-96-8)	Heptachlor epoxide (1024-57-3)
4-Bromophenyl phenyl ether (101-55-3)	Pyrene (129-00-0)
Endosulfan, beta- (33213-65-9)	1,2,4,5-Tetrachlorobenzene (95-94-3)
Endosulfan, alpha (959-98-8)	

What is the Source of the Data Used in this Report?

For this report, we use the TRI data as the primary source of information to analyze and identify trends regarding the extent to which chemical quantities have increased or decreased over time, the EPA Regions and States where each of these NPEP Priority Chemicals are generated, and the industry sectors that generate/manage these chemicals. The TRI is a publicly available EPA database that contains information on more than 650 toxic chemicals that are being used, manufactured, treated, transported, or released into the environment. This information is reported annually and reviewed and updated, on an on-going basis, to reflect corrections made to reported data.²

The TRI covers a wide variety of industry sectors, including those in manufacturing (i.e., Standard Industrial Classification (SIC) codes 20 through 39). These industry sectors account for more than 90 percent of the hazardous waste generated in the U.S.^{3,4} Facilities in the Manufacturing sectors (SIC codes 20 through 39) have been required to report to the TRI since its inception. Beginning with reporting year 1994, Federal facilities have also been required to report to the TRI. A further expansion of the TRI reporting sectors occurred in 1998 when the following seven sectors were added - Metal Mining (SIC code 10, except 1011, 1081, and 1094), Coal Mining (SIC code 12, except 1241), Electrical Utilities that Combust Coal (SIC codes 4911, 4931, and 4939), RCRA Subtitle C Hazardous Waste Treatment and Disposal Facilities (SIC code 4953), Chemical Wholesalers (SIC code 5169), Petroleum Terminals and Bulk Stations (SIC code 5171), and Solvent Recovery Services (SIC code 7389). It should be noted that these additional seven industry sectors are only covered in the Trends-Analysis of this report.

Information is reported to the TRI on a chemical-specific basis, rather than by hazardous waste stream. Although data reported to TRI includes quantities of chemicals that are contained in the waste, it does not necessarily provide a distinction between hazardous and non-hazardous waste. EPA developed a measurement methodology⁵, summarized in the next section and discussed in more detail in Appendix B, to estimate what portion of the chemical quantity reported to TRI is likely to be found in hazardous waste. This is the quantity referred to as the NPEP Priority Chemical (NPEP PC) quantity.

Biennial Report data from 1997, 1999, and 2001, is also used in the Trends-Analysis to provide trends data for the NPEP Priority Chemicals that are not reported to TRI and to supplement the TRI data (for NPEP Priority Chemicals reported to TRI) to provide further insight into the specific waste streams that may contain these NPEP Priority Chemicals.

² Data for each year are published approximately 15 to 18 months following the end of the reporting year. For example, data for reporting year 2001 were published June 30, 2003.

³ Studies conducted in the early 1990s to determine whether TRI quantities were representative of RCRA waste concluded that the TRI covers a large portion of the hazardous waste generated in the U.S. For additional information on these studies and their findings, refer to Bhatnagar, S., and B.C. Murray; *Efforts to Link the Biennial Reporting System (BRS) and the Toxics Release Inventory (TRI)* (prepared for EPA's Office of Solid Waste); 1997.

⁴ A study conducted in 1995 found that more than 93 percent of hazardous waste was generated at facilities also covered under the TRI. For additional information on this study, refer to INFORM, Inc.; *Toxics Watch 1995*; 1995.

⁵ Please note that the NPEP methodology used in developing this Trends Report differs from the methodology used by the TRI program to show trends for the EPCRA section 313 chemicals in the annual TRI Public Data Release. See Appendix B for a detailed description of the NPEP methodology used in this Trends Report.

What Measurement Methodology was used for this Report?

This section discusses the methodology⁶ used to extract the applicable data from the TRI database to calculate NPEP Priority Chemical quantities. It also discusses the approach used to look at trends for the NPEP Priority Chemicals. In previous trends reports, one methodology was used to examine the GPRA goal and trends in NPEP Priority Chemical quantities. For this report, two approaches have been established from the original methodology. The first approach is used to analyze progress toward EPA's GPRA 50 percent reduction goal and is referred to in this report as the "GPRA-Analysis." The GPRA-Analysis approach, for the most part, parallels the original methodology, but also now includes refinements, as discussed below. The second approach is a modification to the first and is used to analyze trends in quantities of NPEP Priority Chemicals reported over time. It is referred to in this report as the "Trends-Analysis." The Trends-Analysis approach utilizes the original approach as a base line; however, it has been modified to address certain segments of the TRI reporting universe not previously taken into account (Appendix B). These changes should provide better data for identifying potential opportunities in reducing NPEP Priority Chemicals.

Methodology for the GPRA-Analysis (Appendix B)

Step 1: Extract Data Regarding NPEP Priority Chemicals Reported to TRI

The Chemical Abstract System (CAS) numbers of those chemicals⁷ and their respective data, identified by EPA as NPEP Priority Chemicals, were extracted from the TRI database for reporting years 1991 through 2001. It should be noted that if a facility reported multiple SIC codes, the designated primary SIC code was used. In developing this report, the TRI data (for 1991 through 2001), frozen as of March 3, 2003 were used. This is the same data set used for the *2001 TRI Public Data Release* (June 30, 2003). However, we subsequently made some revisions to the data based on quality assurance (QA) activities. The extracted data were used to create a NPEP Priority Chemical database.

Step 2: Identify Relevant Facilities

To be included in the analysis, a facility must: 1) have a valid EPA identification (ID) number (also referred to as RCRA ID); and 2) be in one of the "original" reporting industries (SIC 20-39), i.e., industries that reported to the TRI prior to 1998, the year in which the list of reporting sectors was expanded. Data for facilities that do not meet the above criteria were removed from the GPRA-Analysis database.

Step 3: Identify Relevant Releases and Waste Management Quantities

TRI collects information on quantities of chemicals in wastes that are reported under the categories of releases or waste management. However, not all of these quantities are associated with hazardous waste.⁸ Therefore, it is necessary to determine which quantities are most likely relevant to the measurement of NPEP Priority Chemical quantities in hazardous waste. In order to be included in the NPEP Priority Chemical quantities, a reported chemical quantity needs to meet two criteria: 1) it

⁶ Please note that the NPEP methodology used in developing this Trends Report differs from the methodology used by the TRI program to show trends for the EPCRA section 313 chemicals in the annual TRI Public Data Release. See Appendix B for a detailed description of the NPEP methodology used in this Trends Report.

⁷ For this report, EPA combined each of the three metals (cadmium, lead, and mercury) with its associated compounds and analyzed each of them as a single entity. For example, Lead (CAS No. 7439921) and Lead compounds (CAS No. N420) are addressed as a single entity, Lead and Lead compounds, in this report. It is important to note that the data reported to the TRI are data on specific chemicals in the waste, not on the total quantity of waste. Thus, when the word "waste" is used in the context of TRI data, it only refers to chemicals in the waste.

⁸ The term "hazardous waste" as used in this Trends Report refers to wastes that are regulated under RCRA Subtitle C, which are listed in 40 CFR 261.20-24 (characteristics of ignitability, corrosivity, reactivity, or toxicity), 40 CFR 260.31 (non-specific source wastes), 40 CFR 260.32 (specific source wastes) or 40 CFR 260.33 (discarded commercial chemical products). It should be noted that NPEP chemicals that are released in air emissions or surface water discharge may not be RCRA Subtitle C hazardous wastes, but may be considered to be hazardous under other regulatory statutes.

needs to be associated with hazardous waste, and 2) it needs to be amenable to NPEP Priority Chemical reduction. Data for reported chemical quantities that did not meet these criteria were not included in the NPEP Priority Chemical quantities and were removed from the NPEP Priority Chemical database. Recycling is considered a valid mechanism for minimizing the presence of NPEP Priority Chemicals and, as such, recycled quantities are not included in NPEP Priority Chemical quantities.

Step 4: Calculate NPEP Priority Chemical Quantities

Three quantities were then calculated for each record in the NPEP Priority Chemical database: 1) total land disposal quantity, 2) total energy recovery quantity, and 3) total treatment quantity. The sum of these three quantities is the total NPEP Priority Chemical quantity.

Step 5: Analyze Data and Measure Progress Made Toward the GPRA Goal

The 17 NPEP Priority Chemicals, for which there is data since 1991, are used to measure progress toward the GPRA goal of 50 percent reduction, using 1991 as the baseline year. Changes in NPEP Priority Chemical quantities, from 1991 through 2001, are used to measure progress made toward this goal. While there are many different ways to calculate changes between two years, EPA uses an absolute-quantity-change approach for this report. The absolute-quantity-change approach is used to evaluate the difference in the total quantity reported for a particular chemical between two time periods. Three refinements were made to the GPRA-Analysis methodology: 1) to account for changes to TRI reporting thresholds, 2) to distinguish between off-site disposal of hazardous waste vs. non-hazardous wastes, and 3) to eliminate any double-counting of waste disposal reported by one facility as being sent off-site and then reported again by another facility as being managed on-site.

Regarding threshold changes, in order to continue to measure progress towards the GPRA goal on a consistent basis, a “core” group of facilities was established for each NPEP Priority Chemical that had a threshold change. This group consists of all facilities that had reported that chemical in years prior to the threshold change. When compiling data for years after the threshold change, only quantities reported by facilities in the core group for that chemical were included. To account for facilities that may be new to TRI reporting regardless of the change of threshold, if a facility reported more than 10,000 pounds of that particular chemical in TRI Reporting Form R (Sections 8.1 through 8.7), we assumed that this facility would have had to report to TRI based on the original threshold. Therefore, for any such facility, their NPEP Priority Chemical quantities have been retained in the GPRA-Analysis.

On the TRI Reporting Form R, reporting facilities specify whether a chemical is sent to an offsite facility and the type of facility, such as Other Landfill, Land Disposal, etc. Since 1996, the TRI Form R provides a distinction between onsite disposal in Subtitle C landfills (for hazardous wastes) vs. other onsite landfills and a distinction between onsite placement in Class I (for hazardous wastes) vs. onsite Class II-V underground injection wells. However, for the TRI data available for use in this trends report, the TRI Reporting system does not always provide a clear distinction between Subtitle C hazardous waste and Non-Subtitle C waste. To account for this situation, NPEP Priority Chemical quantities sent offsite to landfills, surface impoundments, and Class I wells at facilities that do not have a valid EPA ID number have not been included in the NPEP Priority Chemical total quantity. Note that changes made to the TRI reporting forms for 2002 and 2003 now enable these distinctions to be made.

The potential for “double-counting” of wastes to TRI was evaluated. We concluded that, for certain SIC codes, the quantities of chemicals reported would also have been reported by other facilities. For the GPRA-Analysis, the NPEP Priority Chemical quantities for any facility that reports SIC 3241 - cement kilns (see Appendix B) as its primary SIC code have been removed so that they are not counted twice. This situation also applies to other SIC codes (4953 – Treatment, Storage, and Disposal

Facilities & 7389 – Solvent Recovery Services); however, they are “new” SIC codes and are not included in the GPRA-Analysis (see the Trends-Analysis below).

Methodology for the Trends-Analysis

Step 1: Extract Data Regarding NPEP Priority Chemicals Reported to TRI

Data were extracted from the TRI database for reporting years 1998 through 2001⁹ using Chemical Abstract System (CAS) numbers of those 23 NPEP Priority Chemicals¹⁰ are reportable to TRI. Only those reports submitted on TRI Form R were included; Form A data was excluded. The extracted data were used to create a Trends-Analysis database. In developing this report, the TRI data, frozen as of March 3, 2003, were used.

Step 2: Identify Relevant Facilities

To be included in the Trends-Analysis, a facility needs to have a valid EPA identification (ID) number (also referred to as RCRA ID). Data for facilities that do not have a valid RCRA ID were removed from the database. It should be noted that, in contrast to the GPRA-Analysis, all facilities, regardless of SIC code, are included in the Trends-Analysis.

Step 3: Identify Relevant Releases and Waste Management Quantities

As described above, TRI collects information on chemicals in wastes that are reported as releases or as various methods of waste management.¹¹ However, not all of these reports are associated with hazardous waste. Therefore, it is necessary to determine which reports are most likely relevant to the measurement of NPEP Priority Chemical quantities in hazardous waste. The same process used above in the GPRA-Analysis was used for the Trends-Analysis to identify that 1) the quantity is relevant to the RCRA program and 2) the quantity is amenable to NPEP Priority Chemical reduction.

Step 4: Calculate NPEP Priority Chemical Quantities

Three quantities were then calculated for each record in the NPEP Priority Chemical database: 1) total land disposal quantity, 2) total energy recovery quantity, and 3) total treatment quantity. The sum of these three quantities is the total NPEP Priority Chemical quantity.

Step 5: Analyze Data Trends

Trends were analyzed from 1998 to 2001 for the 23 NPEP Priority Chemicals that are reported to TRI. The six additional NPEP Priority Chemicals that began reporting to TRI in 1995 and 2000 are included in these analyses. Changes in NPEP Priority Chemical quantities, from 1998 through 2001 are calculated using an absolute-quantity-change approach for this report. As discussed above, over the years TRI reporting requirements have changed to include additional industry sectors and reduced reporting thresholds. The Trends-Analysis in this update includes these additional industry sectors, as well as facilities that began reporting to TRI due to the reduced reporting threshold in 2000 and 2001. This additional information should provide more accurate information regarding potential opportunities in reducing or elimination NPEP Priority Chemicals.

⁹ In developing this report, 1991 to 2001 TRI data frozen as of March 3, 2003 were used. This is the same data set used for the 2001 TRI Public Data Release (June 30, 2003). However, these data were revised based on quality assurance (QA) activities.

¹⁰ For the purposes of this report, EPA combined each of the three metals (cadmium, lead, and mercury) with its associated compounds and analyzed each of them as a single entity. For example, Lead (CAS No. 7439921) and Lead compounds (CAS No. N420) are addressed simply as Lead/lead compounds.

¹¹ It is important to note that the data reported to the TRI are data on specific chemicals in the waste, not on the total quantity of waste. Thus, when the word "waste" is used in the context of TRI data, it only refers to chemicals in the waste.

As with the GPRA-Analysis, we have refined the methodology to account for the fact that not all off-site disposal is of hazardous wastes. To address this situation, NPEP Priority Chemical quantities sent offsite to landfills, surface impoundments, and Class I wells at facilities that do not have an EPA ID number are not included in the NPEP Priority Chemical total quantity.

The potential for “double-counting” of wastes to TRI was accounted for by removing the NPEP Priority Chemical quantities for any facility that reports SIC 3241 (cement kilns), SIC 4953 (TSD facilities), or SIC 7389 (solvent recovery services) as its primary SIC code so that they are not counted twice.

Finally, a significant quantity of certain NPEP Priority Chemicals, especially metals, that are reported to the TRI may be contained in materials covered by the Bevill exemption and therefore exempt from RCRA Subtitle C regulation. Although the current measurement methodology is keyed to determining quantities of NPEP Priority Chemicals in “RCRA hazardous wastes” it previously did not identify what portion of the NPEP Priority Chemicals reported to TRI may be Bevill-exempt. Therefore, for the Trends-Analysis, the quantities of NPEP Priority Chemicals from specific facilities and SIC codes that we believe may be associated with RCRA Subtitle C Bevill-exempt wastes were removed from the total NPEP Priority Chemicals quantity.

Step 6: Use Hazardous Waste Biennial Report (BR) Data to Analyze Trends for NPEP Priority Chemicals

The current measurement methodology for the NPEP Trends Report is based solely on TRI data. However, the TRI data is not available for acenaphthene, fluorene, acenaphthylene, heptachlor epoxide, 4-bromophenyl phenyl ether, pyrene, endosulfan, beta- , 1,2,4,5-tetrachlorobenzene, or endosulfan, alpha. Therefore, a methodology was developed to identify and extract the necessary data from the Hazardous Waste Biennial Report (BR) data to evaluate trends for these chemicals over time. This approach is described in Appendix B. Biennial Report data from 1997, 1999, and 2001, is used in the Trends-Analysis to provide trends data for the NPEP Priority Chemicals that are not reported to TRI and to supplement the TRI data (for NPEP Priority Chemicals reported to TRI) to provide further insight into the specific waste streams that may contain these NPEP Priority Chemicals. The use of BR data provides additional insights into the waste streams containing NPEP Priority Chemicals that present potential opportunities in reducing or eliminating NPEP Priority Chemicals.

Quality Assurance Activities Undertaken by EPA for the Data used in this Report

It is important to ensure that the TRI data used in the measurement methodology is accurate. Otherwise, errors in the data could lead to incorrect interpretation of trends. This section discusses the quality assurance (QA) efforts made by the TRI program within EPA’s Office of Environmental Information (OEI) that collects TRI data as well as QA activities conducted as part of the measurement methodology used to develop this report. The TRI Program takes several steps to ensure the quality of their data. Although TRI data are subject to QA checks and a sample of individual reports are examined for potential errors, undetected reporting errors still do occur. These errors may not be very noticeable in national-level analyses, but they can have a major effect when looking at trends on the state level or at chemical quantities with only a small number of TRI reporters.

In developing this report, we conducted a series of QA activities specifically related to the NPEP Priority Chemical data submitted to the TRI for reporting years 1998 through 2001. Selected facilities with significant changes were checked to confirm the significant change (see Appendix B for further explanation on QA procedures).